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Indian Standard

TECHNICAL REQUIREMENTS OF AGRICULTURAL TRACTORS FOR WET LAND CULTIVATION

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TECHNICAL REQUIREMENTS OF AGRICULTURAL TRACTORS FOR WET LAND CULTIVATION

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Indian Standard

TECHNICAL REQUIREMENTS OF AGRICULTURAL TRACTORS FOR WET LAND CULTIVATION

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 30 November 1984, after the draft finalized by the Agricultural Tractors and Power Tillers Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 Wet land cultivation, popularly known as puddling is an important tillage operation in the cultivation of transplanted paddy. The agricultural tractors are increasingly being used for wet land cultivation. The success of mechanized paddy cultivation with the agricultural tractors depend upon how efficiently it can be operated in wet paddy fields. A need was, therefore, felt to formulate an Indian Standard on this subject for the guidance of the manufacturers and users.

0.3 In the formulation of this Indian Standard, assistance has been derived from the Central Farm Machinery Training and Testing Institute, Budni.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the technical requirements for use of agricultural tractors for wet land cultivation (puddling operation).

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definition shall apply.

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*Rules for rounding off numerical values (*revised*).

2.1 Agricultural Tractors — *See* **11.1** of IS : 9939-1981*.

2.2 Cage Wheel — *See* **2.3** of IS : 9939-1981*.

2.2.1 *Half Cage Wheel* — *See* **2.4** of IS : 9939-1981*.

2.2.2 *Full Cage Wheel* — The cage wheel used in place of pneumatic wheels (tyres).

2.3 Puddling — The mechanical manipulation of soil in presence of standing water in the field to create an impervious hard pan below the puddle zone so as to prevent loss of water through leaching and facilitate the transplanting of paddy seedlings by making the soil softer.

3. CONSTRUCTIONAL REQUIREMENTS

3.1 As the tractor is required to be operated under wet conditions, pre-treatment to sheet metal should be adequate to prevent corrosion.

3.2 The tractor should have independent braking system.

3.3 The tractor may be equipped with differential lock.

3.4 Adequate provision should be made for the drainage of water near foot rest and operator's work place.

3.5 Outside part should be such that they are not affected during the water cleaning of the tractor as normally tractor requires thorough cleaning with water after puddling operation.

3.6 Where choice for fitting tyre is available, it is advisable to use tyres having broader contact area.

3.7 Exhaust system of the tractor should be appropriately positioned to prevent ingress of water and mud during operation.

3.8 Provision for fitting half cage wheel and full cage wheel shall be made. The half cage wheel may conform to the requirements given in IS : 11081-1984†.

NOTE — Indian Standard on full cage wheel is under formulation. Till the publication of the standard, requirements shall be as agreed to between the purchaser and the manufacturer.

3.9 The sealing of the critical components should be effective. The following critical components and systems should be free from entry of water and dust/mud:

a) Lubricating oil in the engine sump, transmission, hydraulic housings, final drive housings and steering box.

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*Glossary of terms relating to agricultural tractors and power tillers.

†Specification for half cage wheel for agricultural tractors.

b) Brake assembly.
c) Clutch assembly.
d) Rear axle assembly.
e) Front axle assembly including stub axle, front wheel hubs, king pin and centre (pivot) pin assembly.
f) Starter motor and dynamo.
g) Electrical components, such as magneto, battery, and cut out.

3.10 Provision should be made to plug various weep holes or inspection holes provided in the transmission housing, clutch housing, rear axle housing, etc.

4. OPERATING REQUIREMENTS

4.1 All the necessary instructions of the manufacturers for preparing the tractor for wet land operation should be strictly followed.

4.2 Necessary servicing and periodic maintenance during and after the use for wet land operation should be conducted in accordance with the printed literature of manufacturers.

4.3 Taper plugs used for plugging the weep holes or inspection holes should be opened to allow the water to drain out at suitable intervals as recommended by the manufacturers.

4.4 While using cage wheels, for reasons of safety and obtaining good quality puddle, a suitable implement like puddler, disc harrow, rotavator may be used.

5. LITERATURE

5.1 The operator's manual or other printed literature supplied with tractor should include necessary instructions for preparation, safe operation and the maintenance of the tractor for wet land operation.

5.2 The manufacturers should also provide the information with respect to front axle reaction in terms of the front mass for various usage of the wet land cultivation, that is for half cage wheel or full cage wheel to ensure stability and steerability of the tractor. The mass can be varied by the user depending upon the need.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	1 N = 1 kg.m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2